Turmeric prevents experimental rheumatoid arthritis, bone loss

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An ancient spice, long used in traditional Asian medicine, may hold promise for the prevention of both rheumatoid arthritis and osteoporosis, according to a recently completed study at The University of Arizona College of Medicine.

Turmeric, the spice that flavors and gives its yellow color to many curries and other foods, has been used for centuries by practitioners of Ayurvedic medicine to treat inflammatory disorders. Turmeric extract containing the ingredient curcumin is marketed widely in the Western world as a dietary supplement for the treatment and prevention of a variety of disorders, including arthritis.

At the UA College of Medicine, Janet L. Funk, MD, working with Barbara N. Timmermann, PhD, then-director of the National Institutes of Health (NIH)-funded Arizona Center for Phytomedicine Research at the UA, set out to determine whether (and how) turmeric works as an anti-arthritic. They began by preparing their own extracts from the rhizome, or root, of the plant, providing themselves with well-characterized materials to test and to compare with commercially available products. (Dr. Timmermann since has joined the faculty of the University of Kansas, Lawrence, Kan.)

Dr. Funk and her colleagues then tested in animal models a whole extract of turmeric root, only the essential oils, and an oil-depleted extract containing the three major curcuminoids found in the rhizome. Of the three extracts, the one containing the major curcuminoids was most

similar in chemical composition to commercially available turmeric dietary supplements. It also was the most effective, completely inhibiting the onset of rheumatoid arthritis.

Dr. Funk, an endocrinologist in the UA Department of Medicine, says this study provides several noteworthy "firsts." Completed with the researchers' own prepared, well-defined extracts, the study represents the first documentation of the chemical composition of a curcumin-containing extract tested in a living organism, in vivo, for anti-arthritic efficacy. It also provides the first evidence of anti-arthritic efficacy of a complex turmeric extract that is analogous in composition to turmeric dietary supplements.

The significance, she explains, is that translating the results of trials such as these to clinical use depends on accurate information about the chemical content and biological activity of the botanical supplements available for use. This work paves the way for the preclinical and clinical trials needed before turmeric supplements can be recommended for medicinal use in preventing or suppressing rheumatoid arthritis.

This study also provides the first in vivo documentation of a mechanism of action – how curcumin-containing extracts protect against arthritis. The researchers found that the curcuminoid extract inhibits a transcription factor called NF-KB from being activated in the joint. A transcription factor is a protein that controls when genes are switched on or off. Once the transcription factor NF-KB is activated, or turned on, it binds to genes and enhances production of inflammatory proteins, destructive to the joint. The finding that curcuminoid extract inhibits activation of NF-KB suggests that turmeric dietary supplements share the same mechanism of action as anti-arthritic pharmaceuticals under development that target NF-KB. It also suggests that turmeric may have a use in other inflammatory disorders, such as asthma, multiple sclerosis and inflammatory bowel disease.

In addition to preventing joint inflammation, Dr. Funk's study shows that the curcuminoid extract blocked the pathway that affects bone resorption. Noting that bone loss associated with osteoporosis in women typically begins before the onset of menopause, she has begun work on another NIH-funded study to determine whether turmeric taken as a dietary supplement during perimenopause can prevent bone loss and osteoporosis. Both of the studies are supported by the National Center for Complementary and Alternative Medicine (NCCAM) and the Office of Dietary Supplements (ODS), both of the NIH.

An initial publication of the rheumatoid arthritis study results in the *Journal of Natural Products*, which was among the most-accessed articles from April-June 2006 in this prestigious American Chemical Society journal, is being followed by more detailed study results, which will appear in the November 2006 issue of the American College of Rheumatology flagship journal, *Arthritis and Rheumatism*. The article, "Efficacy and Mechanism of Action of Turmeric Supplements in the Treatment of Experimental Arthritis," is scheduled to appear in the online issue of *Arthritis and Rheumatism* Monday, Oct. 30, 2006.

Source: University of Arizona Health Sciences Center